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AF 1733

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: John E. Holland et al.
Serial No.: 08/957,431
Filed: October 24, 1997
Confirmation No.: 2082
For: **LAMINATED FABRIC**

Examiner: J. Goff
Group No.: 1733

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Board of Patent Appeals and Interferences

Sir:

APPELLANT'S BRIEF PURSUANT TO 37 CFR 1.192

This brief is in furtherance of the Notice of Appeal filed in this case on December 16, 2003. A check is enclosed in the amount of $165.00 representing the brief fee. If any additional fees for the accompanying Appeal Brief are required, Appellant requests that this be considered a petition therefor. The Commissioner is hereby authorized to charge any additional fees which may be required to Deposit Account No. 09-0528.

This brief is transmitted *in triplicate.*

By a separate paper filed contemporaneously herewith, Appellant has requested an oral hearing.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is JHRG, LLC, of Spring Hope, North Carolina.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to Appellant or Appellant's legal representative which will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

The pending claims in the application are 25 – 29 and are reproduced in the Appendix hereto. Claims 1-24 have been canceled. Claims 25-29 are appealed.

IV. STATUS OF AMENDMENTS

An amendment is filed contemporaneously herewith, subsequent to the Examiner's final rejection. The amended claims (with markings to show proposed changes) are also reproduced in the Appendix hereto.

V. SUMMARY OF INVENTION

Appellant's claimed invention is directed to a method for making a cut and puncture resistant laminated *fabric* that is highly flexible and impervious to air and fluids (Page 1, Lines 13-24). The method comprises a first step of selecting a fabric that is formed from high performance yarns. The yarns are selected from the group consisting of extended chain polyethylene, ultra high molecular weight polyethylene (linear, or non-crosslinked ultra-high molecular weight polyethylene, as is the conventional form), and aramid (Page 2, Lines 25-27). Yarns having a denier between about 360 and 1,200 (Pages 8-13, Examples 1-17) have been found most suitable for forming a highly flexible, i.e., not rigid, fabric that can be rolled or easily flexed to conform to an opening or article to be covered.

A thin film of thermoplastic material is positioned on at least one side of the fabric. The thermoplastic film is selected from high density polyethylene, low density polyethylene, and ethylene vinyl acetate (Page 2, Lines 23-25) and desirably has a thickness of only between about 4 mils and 24 mils (Pages 8-13, Examples 1-17). As described in Appellant's specification, it has been found that "polyethylene and EVA films adhere well to fabrics constructed from high performance polyethylene fibers...given sufficient heat, time, and pressure" (Page 4, Lines 3-5).

The thermoplastic film may also be tacked to the fabric as an intermediate step (Page 6, Lines 23-25). Once the thermoplastic film has been positioned on/tacked to the fabric, a pressure of between about 50 psi and 500 psi (Page 15, Lines 6-7) is applied to the fabric and film at a temperature of between about 230 degrees Fahrenheit and 290 degrees Fahrenheit (Page 15, Lines 4-5). The temperature and pressure are maintained for between about 5 minutes and 15 minutes (Page 15, Lines 5-6). It has been found that this temperature and pressure combination for a contact time of 5 to 15 minutes causes the thermoplastic film to soften and bond with the

fabric. Additionally, some portion of the film is forced into the interstices of the fabric construction (Page 5, Lines 14-16). More specifically, when the thermoplastic film is applied under these conditions, the fabric to film adhesion exceeds the tensile strength of the film itself (Page 9, Example 4, Lines 17-19).

Thus, Appellant's invention is concerned with bonding a lightweight film to a fabric formed of high performance yarns in such as way as to form a durable air and water impervious coating. Any chemical bonding or alterations in crystalline structure are not important so long as the physical properties (cut and puncture resistance, flexibility, and impermeability) are achieved in the end product.

VI. ISSUES

There are four basic issues on appeal:

1. Whether Claims 25 and 26 are unpatentable over McCarter et al. (U.S. Patent No. 5,567,498) in view of Park (U.S. Patent No. 5,547,536) and Rousseau (U.S. Patent No. 5,789,327), under 35 U.S.C. 103(a).

2. Whether Claims 27-29 are unpatentable over McCarter et al., Park, and Rousseau, and further in view of Anderson (U.S. Patent No. 4,424,253), under 35 U.S.C. 103(a).

3. Whether Claims 25 and 26 are unpatentable over Park in view of McCarter et al., under 35 U.S.C. 103(a).

4. Whether or not it would have been obvious to one of ordinary skill in the art to modify the teaching of Park and McCarter et al., and further in view of Anderson to include process steps for tacking and applying pressure using a hydraulic press (Claims 27-29).

A further issue raised by the final rejection is whether Claims 25-29 are unpatentable under 35 U.S.C. 112, first paragraph. For the reasons discussed in part VIII below, it is believed that the basis for this rejection has been obviated by the amendment filed with this brief.

This Board is being asked to review and reverse the Examiner's rejection of Claims 25-29 under 35 U.S.C. § 103(a).

VII. GROUPING OF CLAIMS

Claims 25-29 may be considered together.

VIII. ARGUMENTS

A. Rejections Under 35 U.S.C. § 112, First Paragraph

The final Office Action rejects pending Claims 25-29 as failing to comply with the written description requirement. First, the Examiner has rejected previously amended Claim 25 as requiring a "flexible" fabric. The Examiner contends that it is unclear where in Appellant's specification the fabric is disclosed as being flexible. While the Examiner himself, in his 35 U.S.C. 103 rejections that follow, notes that the laminate in McCarter is intrinsically flexible because it can be wound on a take-up roll (as can Appellant's as described in Example 13), Appellant has now amended Claim 25 to remove the term "flexible". Appellant further amends Claim 15 to change to change the lower value for denier to "360" since the lowest value disclosed in the specification is 360 denier. Additionally, the Examiner rejects amended Claim 25 as requiring the ultra high molecular weight polyethylene to be non-crosslinked. While ultra high molecular weight polyethylene is conventionally non-crosslinked, as those skilled in the art know well, Appellant nonetheless has now amended Claim 25 to remove the modifying phrase "non-crosslinked". Lastly, the Examiner now rejects Claim 26 as requiring the step of tacking

"before applying a pressure to the fabric". Claim 26 has now been amended to incorporate the Examiner's suggestion.

B. Rejections Under 35 U.S.C. § 103

The Examiner has rejected Claims 25 and 26 under 35 U.S.C. §103(a) as being unpatentable over McCarter et al. (U.S. Patent No. 5,567,498) in view of Park (U.S. Patent No. 5,547,536) and Rousseau (U.S. Patent No. 5,789,327); Claims 27-29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over McCarter, Park, and Rousseau, and further in view of Anderson (U.S. Patent No. 4,424,253). Claims 25 and 26 are further rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of McCarter et al.; and, Claims 27-29 are further rejected as being unpatentable over Park and McCarter et al., and further in view of Anderson.

1. The Prior Art is Different

The disclosure of McCarter et al. is somewhat difficult to follow, but as best understood it is directed to a flexible ballistic resistant article which includes a network of high strength fibers in an elastomeric matrix. While McCarter et al. does not define "matrix" in terms of his invention, the word is conventionally known in the laminate, prepreg, and circuit board arts to refer to an agent that is used to make an agglomerate mass. See *Dictionary of Scientific and Technical Terms* 1292, McGraw-Hill, New York (2003). That is, the matrix material holds together and provides the structure for the network layers comprising the ballistic article. Without the matrix material, the fiber networks would have no independent structure, unlike a fabric. While McCarter et al. mentions that the fiber network can be nonwoven, woven, or knitted, there is no teaching how such constructions could be used in the construction of the

ballistic article. Instead, the preferred network configuration (Col. 2., Lines 64-67) comprises fibers that are unidirectionally aligned so that they are substantially parallel to each. It is apparent, however, that the fiber network is embedded in the matrix, not bonded to the surface.

While McCarter et al. discloses the use of high strength fibers that may be "impregnated with" or "embedded in" a matrix material, including polyethylene, any similarities between McCarter et al. and Appellant's claimed invention stops there. In Column 9, McCarter et al. discloses several methods for impregnating or embedding the plurality of parallel fibers. For example, the fiber network can be coated with a matrix material or embedded in a film. The fiber can be carried through a solution of matrix material to coat the fiber before it is dried. When a film is used, the "matrix" film is fed onto one side of the unidirectional fiber network while heating to "sufficiently" impregnate the fiber network with the film without damaging the fiber or the physical properties of the resin matrix (Column 9, Lines 17-21). Nowhere does McCarter et al. disclose temperatures, pressures, or times for these embedding or impregnating operations, although these are critical to the method of the present invention. They are what set it apart from the prior art. Appellant parenthetically notes that at Column 6, Lines 58-63, McCarter et al. does disclose temperatures and pressures for pressing the impregnated fiber network into a second matrix material film. However, the Examiner, evidently recognizing the inapplicability of this disclosure to Appellant's claimed process, did not cite it in the final rejection, but rather stated that "McCarter et al. are silent as to the particular values of the lamination/process variables, i.e. amount of heat, pressure, and time."

Park is also directed to a method for laminating a ballistic laminate structure. Park's structure is a laminate that is formed of high performance fibers that are cross-plied together and then covered with a thin film to fix the fiber arrays in position. As with McCarter et al., the

cross-plied arrays of unidirectional fibers would have no structure were it not for a matrix material to hold them together. Park's construction comprises an array of parallel fibers that are passed over a film application roller 15 where a thin film is applied. A prelamination roller 18 presses the fibers onto the film which is supported by a heated platen 19. The fibers and film are then laminated by passing them though a pair of heated nip rollers 20, 21. The assembled laminate is then wound on a take-up beam 22 for later use. The fiber/film composite is subjected to pressure for only an instant, not 5-15 minutes!

Rousseau is directed to an armor panel. The Examiner cites Rousseau as disclosing a fabric having a denier range similar to Appellant, wherein a fabric of high performance yarns is laminated to a thermoplastic film. Rousseau does not disclose a laminated film/fabric construction; rather, Rousseau employs an elastomeric adhesive material only to laminate together a number of layers of cloth material. Beyond having some beginning material properties (the fabric and adhesive), Rousseau provides no other relevant teachings.

Anderson is directed to laminating sheet structures including polyolefins. Anderson is directed to an entirely different chemical and material structure for sheets of chlorinated hydrocarbon elastomeric that are laminated to sheets of linear polyethylene or linear copolymers of ethylene. The Anderson reference is relied upon by the Examiner only to name different types of lamination equipment.

2. The Examiner Has Failed to Justify the Proposed Modification to McCarter el al. In Rejecting Claims 25-29

It is the burden of the Examiner to establish a prima facie case of obviousness when rejecting claims under 35 U.S.C. §103. In re Reuter, 651 F.2d 751, 210 USPQ 249 (CCPA 1981). The CAFC (and the CCPA before it) have repeatedly held that, absent a teaching or

suggestion in the primary reference for the need, arbitrary modifying of a primary reference or combining of references is improper. The ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). In re Geiger, 815 F. 2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987).

As to Claims 25-29, the Examiner presents McCarter et al. as his primary reference. As described above, however, McCarter et al. forms a textured ballistic article by first embedding or impregnating a unidirectional array of fibers in a matrix material. In one embodiment, the matrix film is fed onto at least one side of the fiber network while heating (it is unclear what is actually being heated) for an undefined time that is "sufficient' to impregnate, not bond, the fiber network to the film (Column 9, Lines 17-21). "Impregnating" is different from "bonding". In fact, the term "bond" does not even appear in the McCarter et al. reference. This is because McCarter et al. is not concerned, and does not recognize a problem with, actual bonding between the fibers and the matrix. If you "impregnate" the fiber network in a matrix, you do not need to bond a film to a fabric. Rather, McCarter et al. is concerned only with fixing the fiber network by embedding or impregnating them in the matrix material; it is not necessary that any actual bonding take place, and none does.

Throughout the McCarter reference, the only process variable that is disclosed, as it pertains to forming a network layer is temperature (heat), when feeding the matrix film onto the fiber network; however, even so, no particular value is disclosed. The Examiner has confused a fiber network with a composite of two or more network layers as described in Columns 7 and 8 of McCarter et al. Temperature and pressure are only important to McCarter et al. during the process of "molding" two or more individual fiber layers together into a composite ballistic article.

The Examiner ignores the bonding aspect, however acknowledges that McCarter et al. is silent as to the particular values of the lamination/process variables. It is important, however, that the temperatures and pressures are what result in the bond. The Examiner, however, makes the unsupported assertion that it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the appellant's values and thus create a laminate having a strong bond strength between the layers, as determining these variables would require nothing more than ordinary skill and routine experimentation.

Appellant respectfully submits that the Examiner has misapplied the rule of routine experimentation as applied to the primary reference. In fact, it appears that the Examiner is using the appellant's process variables in hindsight in an attempt to apply them to McCarter et al. This simply cannot be done. First, as the Federal Circuit, and the CCPA before it, has repeatedly said in a line of cases extending back decades, "routine experimentation" must be within the teachings of the art, i.e., the primary reference. *In re Fay and Fox*, 347 F.2d 597, 602, 146 USPQ 47, 51 (CCPA 1965). Given this focus, McCarter et al. mentions only the use of heat for a time sufficient to impregnate the fiber network with the film matrix. While one in the art might experiment with varying degrees of heat and varying times to arrive at one or more temperature/time combinations, McCarter et al. does not disclose or suggest the application of pressure. Even if McCarter did disclose applying pressure, the Examiner's rejection would still be improper because any experimentation would have to be within McCarter's teachings. In that assumed case, one of ordinary skill, following McCarter et al., might experiment to determine how much heat, pressure, time, etc., might be necessary in order to impregnate, as taught by McCarter et al. The parameters determined by such experimentation, however, would not be those cited in Appellant's claims (as the Examiner assumes they would be), since Appellant's

parameters were determined as being necessary for bonding, not impregnating. Thus, since pressure is not within the teachings of McCarter, there can be no motivation or need for experimentation with pressure. Further, this would not even likely occur to one in the art since McCarter et al. is not attempting to bond the matrix material to the fiber network. Even so far as time and temperature are concerned, there is no indication that optimization of these parameters within the teachings of McCarter et al., i.e., for used in a non-pressurized process of impregnation, would result in values corresponding to the ranges claimed by the appellant. The CCPA and the Federal Circuit have characterized this in yet another way; i.e., "changes...may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art". *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Appellant submits that such a result is the case with Appellant's claimed process, which yields a result that is different in kind; i.e., Appellant's thermoplastic film bonds with the fabric when the temperature is between about 230 degrees Fahrenheit and 290 degrees Fahrenheit, the pressure applied is between about 50 psi and 500 psi, and these conditions are maintained for between about 5 and 15 minutes. Appellant does not merely impregnate or embed. As Appellant described in his specification:

> While the actual mechanism of bonding has not been identified, it is believed to involve more than the forcing of the film into the interstices of the fabric construction. Polyethylene films applied to polyethylene fibers adhere sufficiently so that the force required to remove the film from the fabric exceeds the strength of the film. After initial lamination, continued heat treatment improves the adhesion, suggesting that the lower density polyethylene film is diffusing into the crystalline structure of the high performance fibers. (Page 4, Lines 5-11).

Appellant therefore submits that the Examiner's rejection of independent Claim 25 should be reversed.

2. The Examiner Has Failed to Justify the Proposed Modification to Park

With respect again to Claims 25 and 26, the Examiner attempts a second approach at showing obviousness by presenting Park as his primary reference. The Examiner asserts here also that Park discloses all of the limitations of Appellant's claimed invention, except for the particular values of the lamination/process variables, i.e., temperature, pressure, and time.

Appellant submits that the Examiner's conclusion is no better supported within the teachings of Park than it was with McCarter et al. as the primary reference. In fact, the Examiner has also mischaracterized the teaching of Park. Park describes a process whereby a single roller presses an array of fiber bundles onto a film. After heating the fiber bundles and the attached film, lamination is accomplished by passing the composite through a pair of heated nip rollers. The resulting laminate is then wound on a take-up beam for later use.

As those skilled in the art will appreciate, lamination through the use of nip rollers is an instantaneous lamination process that involves only the momentary application of pressure at the interface of the rollers. Thus, Park does not teach or contemplate the application of pressure for more than just an instant. This is a critical difference from the claimed 5-15 minutes. It follows, then, that routine experimentation with pressures and temperatures within the bounds of Park's teaching could not and would not lead to an application having a pressure applied for between 5 and 15 minutes, or to any time duration. That process variable is not important to Park. Again also, Appellant's claimed process yields a different result that is different in kind from the mere pressing together of two materials into a composite mass.

C. Conclusion

Since the Examiner's rejection of the claims based on the prior art has been shown to be inappropriate, the rejection should be reversed and the case remanded to the Examiner for allowance of pending claims 25-29. Such action is earnestly solicited.

Respectfully submitted,

C. Robert Rhodes
Registration No. 24,200

Date: 2-17-04

File No.: 3781-011

APPENDIX

Claims in the Application:

25. A method for making an impervious cut and puncture resistant laminated flexible fabric, comprising:

(a) selecting a fabric formed of high performance yarns, the yarns being selected from the group consisting of extended chain polyethylene, non-crosslinked ultra high molecular weight polyethylene, and aramid and having a denier between about 350 and 1,200, the fabric having first and second sides;

(b) positioning a thermoplastic film over at least one of the first and second sides of the fabric, the thermoplastic film being selected from the group consisting of high density polyethylene, low density polyethylene, and ethylene vinyl acetate and having a thickness of less than about 24 mils;

(c) applying a pressure of between about 50 psi and 500 psi to the fabric and thermoplastic film at a temperature of between about 230 degrees Fahrenheit and 290 degrees Fahrenheit; and

(d) maintaining the pressure and temperature for between about 5 minutes and 15 minutes so that the thermoplastic film softens and bonds with the fabric.

26. The method of Claim 25 further including the step of tacking the thermoplastic film over at least one of the first and second sides of the fabric before applying a pressure to the fabric.

27. The method of Claim 26 wherein the tacking step is conducted using a heated calender roll device.

28. The method of Claim 26 wherein the tacking step is conducted using a heated flat press.

29. The method of Claim 25 wherein the step of applying pressure to the fabric is conducted using a hydraulic press.

Proposed Amended Claims:

25. (currently amended) A method for making an impervious cut and puncture resistant laminated ~~flexible~~ fabric, comprising:

(a) selecting a fabric formed of high performance yarns, the yarns being selected from the group consisting of extended chain polyethylene, ~~non-crosslinked~~ ultra high molecular weight polyethylene, and aramid and having a denier between about [[~~350~~]] 360 and 1,200, the fabric having first and second sides;

(b) positioning a thermoplastic film over at least one of the first and second sides of the fabric, the thermoplastic film being selected from the group consisting of high density polyethylene, low density polyethylene, and ethylene vinyl acetate and having a thickness of less than about 24 mils;

(c) applying a pressure of between about 50 psi and 500 psi to the fabric and thermoplastic film at a temperature of between about 230 degrees Fahrenheit and 290 degrees Fahrenheit; and

(d) maintaining the pressure and temperature for between about 5 minutes and 15 minutes so that the thermoplastic film softens and bonds with the fabric.

26. (currently amended) The method of Claim 25 further including the step of tacking the thermoplastic film over at least one of the first and second sides of the fabric before step (c) ~~before applying a pressure to the fabric~~.

27. The method of Claim 26 wherein the tacking step is conducted using a heated calender roll device.

28. The method of Claim 26 wherein the tacking step is conducted using a heated flat press.

29. The method of Claim 25 wherein the step of applying pressure to the fabric is conducted using a hydraulic press.